Multiple Myeloma Mortality in the United States, 1968-2023, With Forecasts to 2050

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385,780
TOTAL U.S. DEATHS
(1968–2023)

20.07
MEAN AGE-ADJUSTED RATE
PER 100,000

1.44×
HIGHER MORTALITY IN
MALES VS. FEMALES

15.10
PROJECTED RATE BY 2050
PER 100,000

OBJECTIVE

- To evaluate 50-year trends in multiple myeloma mortality in the United States, from 1968 to 2023.
- To characterize mortality disparities by sex, age, race, and geographic region.
- To forecast age-adjusted mortality rates through 2050 using statistical modeling.

STUDY SNAPSHOT

Data Source: CDC WONDER Compressed Mortality File

Study Period: 1968 – 2023 (50 years)

Diagnostic Codes: ICD-8 203 · ICD-9 203.0 · ICD-10 C90.0

Forecast Horizon: Through 2050 (ARIMA model)

Standardization: Age-adjusted to the 2000 U.S. standard population

Subgroup Analyses: Sex, age group, race, and Census region

Population: Adults aged 65 and older with MM as underlying cause of death

METHODOLOGY

❑ Study Design and Data Source

- This was a retrospective observational study using the CDC WONDER database to analyze U.S. mortality data from 1968 to 2023.
- Multiple myeloma deaths were identified among adults aged 65 and older using ICD-8, ICD-9, and ICD-10 diagnostic codes across the study period.
- Demographic and geographic data included sex, age, race/ethnicity, and U.S. census region.

❑ Statistical Analysis

- Age-adjusted mortality rates (AAMR) per 100,000 population were standardized to the 2000 U.S. standard population, allowing fair comparisons across years despite the aging population.
- Joinpoint regression identified specific years where the mortality trend changed direction or speed, and estimated the annual percent change (APC) for each period.
- Negative binomial regression measured how much mortality risk changed with each additional calendar year.
- A non-seasonal ARIMA model, a standard time-series forecasting method, was selected using the Akaike Information Criterion (a measure of model fit) to forecast mortality rates through 2050.
- Model accuracy was checked using residual diagnostics, including the Ljung-Box test, and validated against real 2019-2023 data.

1 IDENTIFY
Deaths by ICD code, 1968–2023

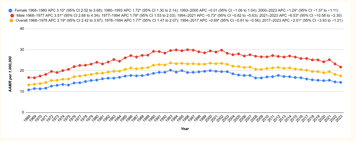
2 MODEL
Negative binomial regression

3 FORECAST
ARIMA projection to 2050

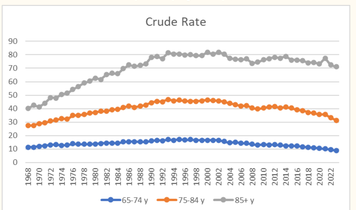
RESULTS

- From 1968 to 2023, multiple myeloma accounted for 385,780 deaths in the U.S., with a mean age-adjusted mortality rate of 20.07 per 100,000 (95% CI, 19.58-20.56).
- Mortality rose sharply from 1968 to 1978 (APC 3.19%; 95% CI, 2.41-3.96%), then continued a modest overall increase, corresponding to an average annual percent change of 0.57% (rate ratio 1.006 per year; 95% CI, 1.004-1.008; P<.001).
- ARIMA forecasting projected a decline to 15.10 per 100,000 by 2050 (95% CI, 6.73-34.14), with good model fit (RMSE 1.196; Ljung-Box P=.905).
- Mortality was consistently higher in men than women (RR 1.44; 95% CI, 1.36-1.51; P<.001) and in adults 85 and older versus 65-74 (RR 2.12; 95% CI, 1.97-2.28).
- Black Americans experienced significantly higher mortality than White Americans (White-to-Black RR 0.54; 95% CI, 0.51-0.58).
- Census Region 2 (Midwest) showed modestly elevated mortality relative to other regions (RR 1.09; 95% CI, 1.03-1.14; P<.001).

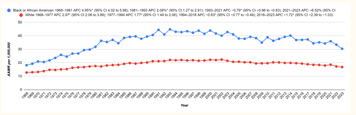
Age-Adjusted Mortality by Sex (1968-2023)



Crude Mortality Rate by Age Group (1968-2023)



Age-Adjusted Mortality by Race (1968-2023)



BACKGROUND

- Multiple myeloma (MM) is the second most common hematologic malignancy in the U.S., accounting for nearly 10% of hematologic tumors and about 1% of all cancer deaths annually.
- MM is a malignant clonal proliferation of plasma cells in the bone marrow, typically diagnosed at a median age of 69, causing bone destruction, renal failure, anemia, and hypercalcemia.
- Roughly 32,000 new cases are diagnosed each year in the U.S., with about 13,000 deaths annually.
- Five-year survival has improved substantially, from about 30% in the 1970s to roughly 60% today, largely due to therapeutic advances.
- Despite these gains, mortality disparities persist. Black Americans face roughly twice the incidence rate of White Americans along with historically higher mortality, and rural populations face added barriers to timely diagnosis and treatment access.

OLDER AGE | MALE SEX | COMORBIDITY BURDEN | SOCIOECONOMIC BARRIERS

CONCLUSION

Although therapeutic advances have driven substantial reductions in multiple myeloma mortality at the population level, these benefits have not been equitably distributed. Persistent disparities by sex, race, age, and region reflect a combination of biological differences, unequal access to advanced therapies, and socioeconomic factors such as income and proximity to specialized care. Projections through 2050 indicate a continued gradual decline in age-adjusted mortality; however, widening uncertainty intervals suggest that multiple myeloma will remain a significant public health burden despite this progress. Targeted strategies to improve early diagnosis, treatment access, and care delivery, particularly for the very elderly, Black populations, and residents of high-burden regions, remain critical to closing these persistent gaps in outcomes.

KEY TAKEAWAYS

Modest 50-Year Mortality Increase

Projected Decline Through 2050

Persistent Disparities by Sex, Age & Race

Continued Surveillance and Equity Efforts

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Risk factors associated with elevated multiple myeloma mortality